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ABSTRACT

A series of studies concerned with the dissemination and assimilation of material contained in journal articles in educational research were conducted. These studies dealt with authors of the articles and other educational researchers conducting research in the same subject matter areas as the articles. The dissemination process was found to be extremely long and slow with little information reaching the general educational research and development community until late in the process. The results of these studies and previously conducted ones dealing with the national meeting indicate that both the informal and formal dissemination systems in educational research are extremely diffuse. Thus it is extremely difficult for the educational researcher to find the information he needs. Moreover, few authors published further in the same area as their original article. A number of suggestions for improving the current dissemination system in educational research are mentioned. (Author)

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Scientific Communication in Educational Research

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Abstract

A series of studies concerned with the dissemination and assimilation of material contained in journal articles in educational research were conducted. These studies dealt with authors of the articles and other educational researchers conducting research in the same subject matter areas as the articles. The dissemination process was found to be extremely long and slow with little information reaching the general educational research and development community until late in the process. The results of these studies and previously conducted ones dealing with the national meeting indicate that both the informal and formal dissemination systems in educational research are extremely diffuse. Thus it is extremely difficult for the educational researcher to find the information he needs. Moreover, few authors published further in the same area as their original article. A number of suggestions for improving the current dissemination system in educational research are mentioned.

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Introduction

Throughout science and technology, professional societies play an essential role in the dissemination of scientific and technical information. It is usually the professional society that sponsors various types of meetings, and publishes the most important journals in the field.

The recent rapid growth of manpower and information in educational research had made the American Educational Research Association (AERA) increasingly aware of its key role in the dissemination of scientific and technical information in educational research (see, for example, Dershimer, 1970). Since 1968, AERA has cooperated in a program of studies, a portion of which are reported in this report, designed to trace, in real time, the dissemination and assimilation of scientific and technical information generated by work begun in 1966 until it could be retrieved from secondary sources such as abstracts and review journals. The approach taken in these studies is that of viewing scientific communication as a large social system composed of a variety of formal and informal elements by means of which the scientist, through many different types of information-exchange behavior, attempts to satisfy the informational needs imposed by his various scientific activities. Results of studies conducted to date indicate that the information-exchange behavior of scientists is the most significant factor in the overall system operation. In their efforts to establish and maintain contact with current work, scientists are continually on the alert for or actively seeking, scientific or technical information relevant to their ongoing or planned work. The scientists closely watch the performance of the system in disseminating, and assimilating the products of their own scientific efforts. If an appropriate channel does not exist, as the producer and the consumers of information, they create new channels or modify the old ones in an attempt to improve the system's performance (Garvey and Griffith 1964). As a result of the scientists behavior, the information flows through the system in an orderly manner and, although there are a variety of routes, specific kinds of information produced by specific types of researchers seek certain outlets on predictable occasions in predictable sequences and time patterns. Regardless of the flow pattern, the ultimate form of dissemination for the vast majority of the scientific information produced is publication in an archival journal. The limitations of this formal channel give constant impetus to the creation and maintenance of many of the elements in the domain on informal communication.

The most important feature of the communication system is that it represents something of a closed--circuit; not only is the scientist a generator, disseminator, and user in the very system of which he is the creator, but the two gross products of the discipline--its information and its manpower--feed back into the system continuously.

A further constraint is the apparent influence upon scientific communication of relatively stable and powerful social norms. There is some suggestion that many of the norms are very resistant to time and influences outside the scientific community, and there is contemporary evidence that much of a scientist's behavior within the system is controlled by attitudes governed by such norms. For example, the bitterness that has surrounded

attempts in physics and psychology to institute formal preprint exchange groups indicates the powerfulness of the norm of evaluation by peers (Maravesik and Pasternak, 1966; Loevinger, 1970).

In addition, there are economic constraints. If we consider the discipline in its national context, we find that funds to support the system are limited and that an increase in funds for one medium must divert them from another. There are direct and explicit links (e.g., subscriptions and page charges) between the flow of information and the flow of resources in the system, and the effectiveness of a new element often attracts funds from an older, well-established medium. This occurrence may cause the older element to change its function or to cease operation, even though it might well have continued to serve an existing function which has importance for the overall discipline.

A main purpose in conducting an intensive study of scientific communication associated with a specific discipline is to locate the critical points at which innovation might be attempted and predict the probably specific and overall effects of such innovations. A fundamental characteristic of our approach to the study of scientific communication is that innovations in any science or technology should be preceded by a study of the existing system.

The first series of these studies dealt with scientific information exchange associated with the 1968 Annual Meeting of AERA because the national meeting usually represents the first "public" dissemination of a large portion of work produced. The first part of these series dealt with scientific information exchange at the meeting (Nelson, Garvey and Lin, 1970) and the second part dealt with journal dissemination of the meeting material after the meeting (Nelson, 1970; 1972). Two striking trends emerged from the studies. First, the informal network associated with premeeting information dissemination appeared to be poorly structured; as a result, the information consumers showed tremendous lack of awareness of who was currently working on what. Second, the premeeting disorganization of the information system in educational research was only temporarily unified at the meeting, and the postmeeting dissemination again became diffused.

The present study focused on the extent to which requestors of meeting presentations which were later published, were aware of the published article and on the dissemination, assimilation and production of material published in the major journals on educational research.

Method

Requester Follow-up

To conclude our study of the national meeting, questionnaires were sent to persons who had requested copies of meeting presentations which were subsequently published in archival journals. Of the 60 respondents who were sent questionnaires, 36 returned them. The questionnaire was designed to obtain the following types of information:

1. The extent to which the requesters had communicated with the author in the ensuing two years.
2. The extent to which the requesters were aware of the article's publication.
3. The requesters' evaluation of both the article and meeting presentation copies.

Journal Article Authors

Selection of journals for the study of the production and dissemination of journal articles proceeded in the following way: The references in AERA journals published during 1965 and 1966 were examined, adding to the sample journals often cited therein, and adding their references. This process continued until a point of diminishing returns had been reached, i.e., until the remaining journals no longer appeared in the mainstream of literature on educational research.

Such analyses, conducted for various disciplines including educational research have indicated that, a small number of journals form the core of the journal literature; a larger number of journals form the periphery of this journal literature; and, a very large group of journals were loosely associated with the first two groups.

On the basis of the analysis for educational research, all of the "core" and the most relevant of the "tangential" journals were selected for study. These journals are shown in Table 1.

Beginning with the first issue published in 1968 and continuing throughout the next two years, as soon as possible after the publication of each issue of a "core" journal, each first author of an article in that issue received a questionnaire pertaining to the content of his article. (If someone was the first author of more than one article,only those articles were selected in which either three or 30% of the citations were to articles published in core journals. A total of 385 authors returned usable questionnaires for a response rate of 90%.

This study was designed to trace the prepublication dissemination of the main content of the article, from the beginning of the work by the author to the time of publication. Prepublication dissemination may include "preliminary" reports (reports of preliminary findings of work not yet completed), and later reports of completed work. The study also sought to determine the extent to which authors of articles on educational research participated directly in these report media and the effect of their participation on their own work as it was modified and revised before submission for publication.

The following topics will be discussed in the first part of the paper:

1. The background characteristics of the authors
2. The prepublication schedule of the work published
3. The scope and effect of prepublication reports
4. The submission of manuscripts to journals
5. The continuity of work in educational research; i.e., the extent to which authors were involved in new work related to their articles at the time of its publication, and
6. The availability of information contained in the journal articles from secondary sources.

The second study concerned a follow-up questionnaire sent to the authors on the average of 26 months after the publication of their article. This questionnaire was designed to determine the following:

1. The extent to which the authors continued work in the same area.
2. The extent to which their new work had been disseminated in journals
3. The information needs of the authors in conjunction with their current research.

Table 1

Journals Studied in Current Program

American Educational Research Journal - Core

Educational and Psychological Measurement - Core

Journal of Educational Psychology - Core

Journal of Educational Research - Core

Child Development - Tangential

Journal of Personality and Social Psychology - Tangential

Personnel and Guidance Journal - Tangential

Other Workers in Same Area

The third study to be described dealt with the group of persons whom the authors of the articles in the journal study cited in the first questionnaire as conducting work in the same subject-matter areas as those of their articles (work which was derived from their findings, stemmed from the same conceptual or theoretical framework, attacked the same problem from a different point of view, stimulated their work, etc.). These persons received questionnaires pertaining to the articles of the authors who had cited them. The questionnaires were designed to determine the following:

1. The extent to which respondents were familiar, before publication of the journal articles, with the work described in the articles.
2. The extent to which respondents had assimilated useful information from authors' prepublication dissemination of the main content of their articles.
3. The extent to which respondents were aware that the articles had been published.
4. The extent to which respondents had examined the articles, and
5. The extent to which respondents acquired useful information from the published articles.

Since the informal network associated with prepublication information exchange was of particular interest each person named by an author was also asked to name one or two persons working in the same area as the published article. These persons, in turn, if they were not included as authors or persons named by authors, were sent the same questionnaires sent to persons named by the authors. This process was repeated once more, but by this time few new persons were being added to the sample. A total of 159 respondents returned usable questionnaires for a response rate of 62%.

Results

Requester Follow-up Study

Only 11% of the requesters knew of the publication of the articles. Because so few requesters even knew that the article had been published, further analysis of this data would have been meaningless.

Information--Dissemination process associated with the production of journal articles on educational research

Characteristics of the Authors

Most of the authors held doctorates (89%), and of those without doctorates (79%) were studying for advanced degrees. The median date of the authors reception of their highest degree was 1964 or four to five years before publication of their articles. (Considering estimates that the number of scientists doubles every 12-15 years, we might well have expected half the authors to have received their highest degree in the past 12-15 years.) We can therefore assume that journal articles authors were a relatively young group of researchers.

The authors named 98 different universities which had conferred their highest degrees. However, over half (54%) of the authors had

received their highest degrees from only 16 universities, and over a third (36%) from only nine institutions. Each author was asked to name the area within his discipline in which he had received his highest degree. Over two-fifths of the respondents indicated psychology (other than educational psychology) as their area, while 27% indicated education (other than educational psychology) and 22% indicated educational psychology. As can be seen in Table 2, this distribution was markedly different from the distribution obtained from the authors of presentations at the 1968 AERA Annual Meeting. The difference in distributions can be understood if the distribution for the various journals studied are examined. AERJ tended to publish more work by persons who received their degrees in educational psychology than the other journals, while the Journal of Educational Psychology and Educational and Psychological Measurement published more work by those who received their degree in psychology, and Journal of Educational Research by those who received their degree in education.

Most of the authors (82%) were working in academic institutions and these 315 authors were working in 150 different institutions. Twenty-eight percent of these authors were the only persons at their institutions producing articles in the studied journals in 1968 and 1969.

Authors were asked to rank various professional activities in terms of the amount of time they devoted to each. Most authors participated to some extent in teaching (82%), applied research (74%), research guidance (71%), consulting (63%), basic research (62%) and administration (51%). Teaching was indicated as the most time consuming activity by 41% of the authors, basic research by 15%, administration by 15% and applied research by 11%.

Nature of Work in Articles

Almost half (48%) of the authors characterized the work reported in their articles as single field studies, while 20% characterized the work as a single experimental study and 11% as theoretical treatises. Only 3% of the articles reported a series of studies and 6% were methodological or statistical studies. The remaining studies were various combinations of the above types of reports.

Descriptions of Dissemination Process

Figure 1 diagrams the process of the dissemination of scientific information from the time a scientist begins his work until the time it appears in secondary sources. The following discussion describes this process for the typical author, and takes as its reference point the date of journal publication, relating all events both before and after publication, to this date.

Work published in the journals studies began 33 months on the average before publication and 11% of the work was initiated five or more years before its publication. Preliminary reports (i.e., reports of the work before its completion) were made by 18% of the authors. The reports were typically made to very small audiences. For example, 70% of all preliminary reports were given as colloquia, briefings, thesis committee reports, written theses or in-house reports. Additionally, only 19% of all reports presented before the article's publication were preliminary reports. Thus, there was little dissemination of the work before its completion. The average preliminary report was

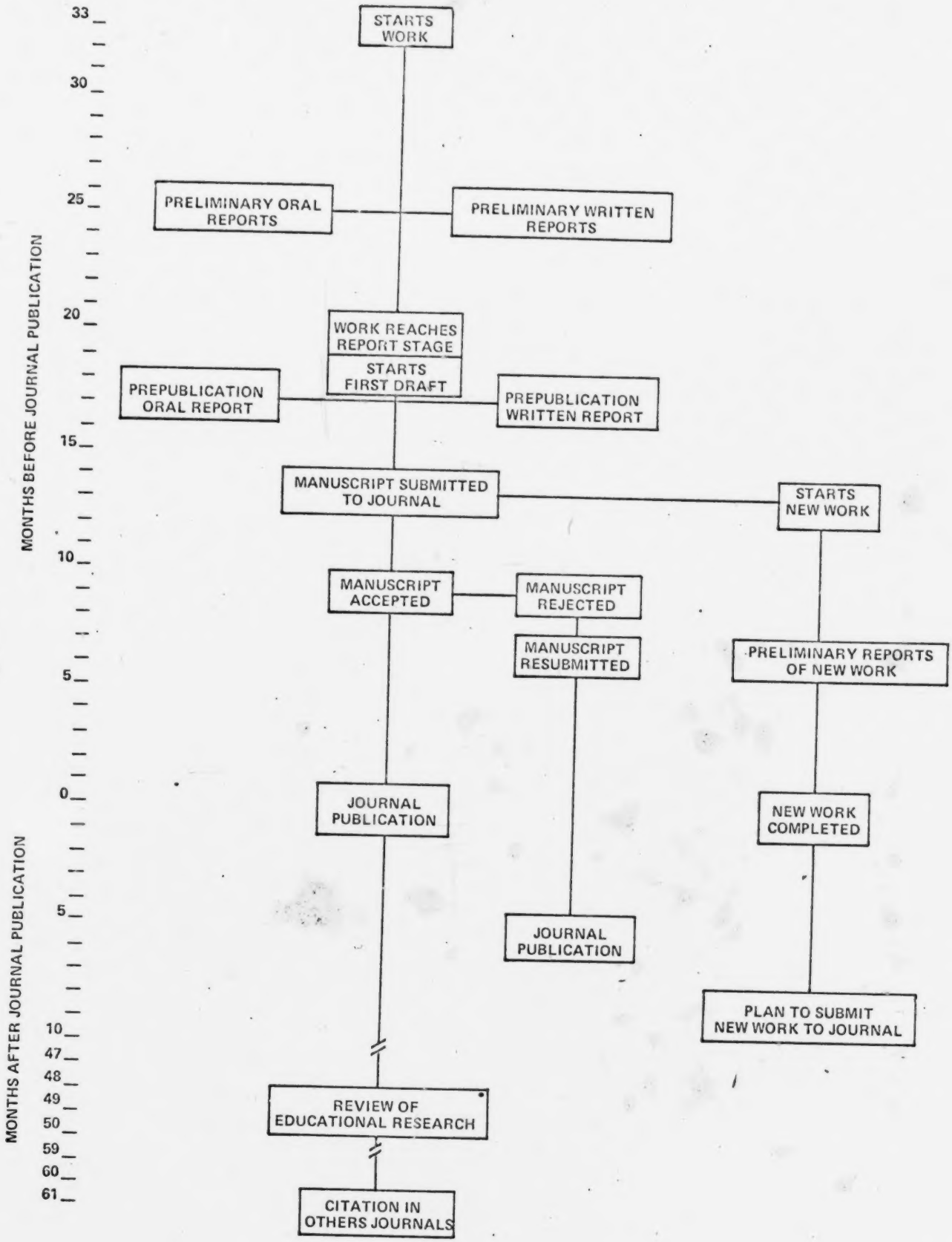


Figure 1

Schematic Diagram of Information Flow in Educational Research

made five months before the work had been completed.

Genuine dissemination began when the authors completed their work--20 months before publication. Fifty-eight percent of the authors made some report of their work between the time it was complete and published. Table 2 shows the percentage of authors making prepublication or preliminary reports as well as kinds of reports made. The most frequent presented types of oral reports were colloquia within the author's own institution (14%), national meeting presentations (13%), and thesis committee meetings (12%). The two types of written reports which were made by at least a tenth of the authors were: dissertations or theses (23%) and technical reports (16%). Almost half (43%) of all reports took place within two months after the author had completed his work. Since 79% of all reports were presented before manuscript submission, once a manuscript had been submitted to a journal for publication, the information contained in it became effectively obscured from the scientific community.

As just mentioned, the thesis or dissertation represented a major prepublication medium for journal articles. However, information based on theses or dissertations moved slowly through the prepublication process since the typical written thesis was complete 25 months before its publication. Moreover, the time between the time work reached a report stage and its submission to a journal was four months greater for those who made prior reports compared to those that did not.

The dissemination of work before it was submitted to a journal enabled authors to disseminate research well before its publication and to receive feedback which allowed them to modify manuscripts before submitting them to journals. As can be seen in Table 3, forty-five percent of those authors who reported contents of their articles before publication reported they had modified their manuscripts because of the feedback received from such prepublication reports. Somewhat more of the authors who made oral reports (39%) than had made written reports (29%) reported such modifications. With regard to oral reports, the more informal the presentation, the more likely the author was to receive feedback which led to some modifications. Thus, 55% of those who presented their findings at thesis committees modified their work as a result of such a presentation, 41% of those who gave colloquia within their own institution did so, while only 26% of those who made presentations at national meetings did so. These modifications may be classified into two types: changes in style or general form (accounting for 40% of the modifications) and changes in content, e.g., clarification or redefinition of concepts, incorporation of others findings, more detailed description of results, new emphasis or change in interpretation, etc. (accounting for 60% of the modifications).

On the average, the authors began writing their manuscripts one month after the work had been completed.

The distribution of preprints (i.e., prepublication copies of the manuscript) represented another form of prepublication dissemination. Forty-two percent of the authors distributed preprints, and on the following occasions: 24% distributed them before submission of the manuscript; 13% after submission but before acceptance of the manuscript, and 15% after acceptance, some authors distributing them

Table 2

Preliminary and Prepublication Reports and Modifications Resulting from Such Reports

	Percentage Making Report (N=385)	Percentage Modifying[a]	
Any Report	70.4%	33.0%	(127)
Oral Report	48.6%	39.0	(187)
Colloquium within own institution	13.6	41.5	(53)
Colloquium outside own institution	3.7	26.7	(15)
Local, State or Regional Meeting	7.4	24.1	(29)
National Meeting	12.8	26.0	(50)
International Meeting	1.2	40.0	(5)
Scientific or Technical Committee	0.5	0.0	(2)
Invited Conference	2.0	12.5	(8)
Thesis Committee Meeting	11.6	55.6	(45)
Briefing	3.5	43.8	(16)
Other Oral	0.2	100.0	(1)
Written Report	58.2	29.0	(224)
Technical Report	15.7	29.5	(61)
In-House Publication	9.1	38.9	(36)
Thesis or Dissertation	22.5	28.4	(88)
Proceedings or Symposium Presentation	1.2	40.0	(5)
Journal Article	3.2	30.8	(13)
Copy of Oral Presentation	5.0	20.0	(20)
Other Written	0.7	33.3	(3)

[a]Numbers in parentheses refer to the "N" on which the percentage is based, i.e., the number of authors making a specific type of report.

on more than one occasion. The median number of preprints distributed at the various stages were two, five and five, respectively.

Authors distributed preprints mainly to two groups: to colleagues working in the same area (mentioned by 72% of those distributing preprints) and to people with some prior knowledge of the work, and who had requested preprints (mentioned by 49% of these authors). Since 49% of the authors sending preprints, sent them to people who had requested them, these requests indicated that some people had been effectively informed of the work through informal communication. Only 14% of the authors who distributed preprints did so as a routine matter to fellow members of a pre-print exchange group.

Those authors who had distributed preprints before submitting their manuscripts to a journal had an opportunity to receive feedback leading to modifications of their manuscripts. Of those authors who sent preprints before submission, 56% modified their manuscripts because of feedback from preprint distribution. Of those authors so modifying their manuscripts, 54% made stylistic changes only, 25% made content changes only, and 22% made both types of changes.

In our tracing of the development of material published in journals on educational research, we have reached the stage at which authors were ready to submit their manuscripts to journals for publication. By the time a manuscript was submitted, the research had been completed for seven months; almost all prepublication reports had been made; and modifications due to consequent information feedback had been made.

As to the criteria authors used to select the journal in which to publish their work, most (82%) of the authors indicated that "the audience reached by the journal" had constituted a major criterion. The editorial policy of the journal was mentioned by 26% of the authors as a criterion.

Not all of the authors had their manuscripts published in the first journal to which they submitted them. Eight-nine (23%) of the authors had either withdrawn their manuscripts from, or had received editorial rejection by, another journal. For 18% of the prior submissions, the authors withdrew their manuscripts, typically because the suggested revisions were inappropriate (mentioned by 15% of the authors). However, most of the authors, 82%, of nonaccepted manuscripts had received editorial rejection of their manuscripts owing mainly (44%) to the inappropriateness of the subject matter for the rejecting journals. Other reasons often given for rejection were: theoretical or interpretational problems (17%) and manuscript length (15%).

These 89 manuscripts were withdrawn or rejected by 43 different journals. At least four of the manuscripts were previously submitted to the following journals: Journal of Educational Psychology (13 manuscripts); American Educational Research Journal (7); Journal of Personality and Social Psychology (6); Psychological Bulletin (5): and Journal of Experimental Social Psychology and Personnel and Guidance Journal (4 each). Journal of Educational Research appeared to be the recepient of manuscripts rejected by the Journal of Educational Psychology and American Educational Research Journal in that it published nine of the 13 manuscripts previously submitted to the Journal of Educational Psychology and five of the seven submitted to American Educational Research Journal. The non-acceptance of a manuscript by one journal

added five months to the overall publication lag. Slightly less than half (44%) of the authors experiencing non-acceptance of their manuscripts revised them before resubmitting them to journals in which they were eventually published.

The presentation of or the modification as a result of a prior report had no effect on the extent to which authors experienced non-acceptance of their manuscripts. Non-acceptance was experienced by 23% of the authors making no prior reports, 24% of those making prior reports and not modifying their work as a result of them, and 23% of those making prior reports and modifying their manuscripts as a result of them.

Authors' Continuation of Work in the Same Area as that Treated in Their Articles

Since the production of scientific information is a cyclical process (researchers tend to continue work in the same area as that treated in the articles at the time of their publication), authors were asked questions in the original questionnaire about work they had done on the same subject since the completion of their articles. By the time of publication most authors (64%) were involved in new work in the same subject-matter area as that treated in their articles, and 73% of this new work evolved directly from the work reported in the published articles. The work of those authors conducting new work had progressed well--by the time articles were published 55% of the new work had been completed. Of the authors whose work had reached the report stage, 40% had reported their new work before the publication of their article, 62% of these authors had made oral reports, and 67% had made written reports.

At the time of publication, 97% of those authors who had initiated new work in the same area reported definite plans for publication of their new work. A journal was the medium most often mentioned for the planned dissemination of this new work (mentioned by 75% of these authors). In addition, books were mentioned by 11% of these authors and technical reports by 9%. The median date when these authors planned to submit manuscripts based on this new work to journals was eight months after the publication of their first articles.

All authors were sent follow-up questionnaires on the average 26 months after their article had been published. The response rate based on 260 returned questionnaires was 68%. Of these authors, 57% had worked in the same subject matter area as their original article subsequent to completing the original work. Of those authors who had conducted subsequent work 64% had submitted at least one manuscript based on this work to a journal, 54% had had at least one such manuscript accepted for publication and 44% had had at least one such manuscript published. Thus, only 25% of the authors had published a subsequent article in the same area as their original article. The 94 authors submitting manuscripts submitted a total of 172 manuscripts to 84 different journals. Only 24% of the manuscripts were sent to core journals. (These were the journals which published their original work.) Moreover, it took 12 journals to account for only 50% of the submissions. This is further evidence as to the diffuseness of the

formal information dissemination system in educational research.

Of those who had conducted research in the same area but had not submitted a subsequent manuscript, 67% indicated that the work was incomplete and 54% indicated that they had insufficient time to prepare a manuscript.

Seventy-five percent of the authors who had conducted a subsequent work in the area were currently involved in research in the same area as of their original article. This work was started on the average three months after the publication of their original article. These studies were typical field studies indicated by 43% of the authors or laboratory experiments indicated by 16%. At the time of the follow-up survey 34% of the authors indicated they were preparing a report of the work; 25% were analyzing the data; 23% were interpreting the results; 16% were collecting the data and 13% were in the theoretical or conceptual planning stage.

For those authors who did no further work in the area after the publication of their original article 32% indicated that the reason for this decision was that they personally became interested in another area. Two other frequently mentioned reasons for not continuing work in the same area were that the work reported constituted completion of the project mentioned by 28% of the authors and a new job mentioned by 15% of them.

Seventy-five percent of the authors who had not conducted subsequent work in the area of their original article were presently conducting research in some other area. This research was typically a field study indicated by 59% of those conducting work and had been started on the average five months after the publication of their original article. At the time of the follow-up survey 28% of the authors were currently preparing a report of the work; 27% were interpreting the results; 23% analyzing the data; 13% collecting data and 12 were in the theoretical or conceptual planning stage.

Since the publication of their original article 56% of the authors not continuing work in the same area had submitted at least one manuscript to a journal; 49% had had at least one article accepted and 41% had had at least one published. These 62 authors submitting manuscripts had submitted 156 manuscripts to 87 different journals. Only 15% were submitted to core journals and it took 20 journals to account for only 50% of the submission.

Citation of the Articles in Secondary Sources

We were also interested in the dissemination process after the articles were published. Three types of secondary sources were examined: abstract journals, references in the "core" journals studied and articles in the Review of Educational Research. The extent to which these secondary sources covered the field of educational research and the time lags between their appearance and the publication of the cited articles were examined. Each of these secondary sources serves a different function in integrating the literature on educational research: (1) the abstract places the article in a public secondary source along with other contemporary works on the same subject; (2) citations by other articles relate the article to the cumulative knowledge on the

subject; and (3) reviews synthesize and evaluate "recent" progress in an area.

At the time of the study no abstract journal covered all four "core" journals. For example, Psychological Abstracts covered the Journal of Educational Psychology and Educational and Psychological Measurement, but not American Educational Research Journal or Journal of Educational Research. Since that time, however, ERIC has started publishing Current Index to Journals in Education but this publication does not publish abstracts for all the articles cited. Thus there is still no abstract journal for the field of educational research.

Another stage in the dissemination processes occurs when the work described in the published journal article is integrated into a published review. In order to obtain an estimate of when this process occurs on the time scale for the information flow in educational research, all journal references in articles published in the 1970 issues of Review of Educational Research were tabulated. These articles cited a total of 1171 journal references.

The following percentages of the total journal references which were citations to articles published by each of the "core" journals gives some indication of the extent to which each of the journals was cited in these reviews:

Journal of Educational Psychology	9.3%
American Educational Research Journal	3.8%
Educational and Psychological Measurement	3.6%
Journal of Educational Research	2.1%

Thus only 23% of the journal reference were to the articles published in the journals studied. Also the average time between publication of the article in one of the "core" journals and its citation in a review was 49 months, and 23% of these citations were to articles at least ten years old.

In their articles, authors usually cited previous work, when relevant in order to place their current work in proper perspective. Examination of recent issues of the "core" journals (i.e., issues published after those included in this study) revealed that insufficient time had elapsed since the studied articles were published to allow for their citation in other articles. Accordingly, to estimate the time lag in this process, we examined every issue in 1970 of each of the "core" journals and tabulated the publication dates of the cited articles published in the studied journals. This procedure revealed 389 citations to articles published previously in these journals.

As can be seen in Table 3, the Journal of Educational Psychology was the most frequently cited journal (48% of all references citing its articles). Educational and Psychological Measurement accounted for 28% of the citations, while the Journal of Educational Research and American Educational Research Journal accounted for 13% and 12%, respecitvely. No doubt the reason so few of the citations were to AERJ was that it started in 1963.

As can be seen in Table 4, the typical citation of an article published by the journals studied occurred 61 months after the articles' publication, i.e., 50% of the citations were to articles published no less than 61 months earlier. The average age of a

Table 3

Cross-Citations of Articles in Journals on Educational Research

Cited Journal	Citing Journal: American Educational Research Journal	Educational & Psychological Measurement	Journal of Educational Psychology	Journal of Educational Research	Total
	(N=58)	(N=101)	(N=141)	(N=89)	(N=384)
American Educational Research Journal	22%	3%	14%	10%	12%
Educational and Psychological Measurement	29	79	5	6	28
Journal of Educational Psychology	41	15	75	46	48
Journal of Educational Research	7	3	6	38	13

Table 4

Median Time Between Publication of Articles in Educational Research Journals and Their Citations in Educational Research Journals

Journal of Cited Article	Journal of Citing Article: American Educational Research Journal	Educational & Psychological Measurement	Journal of Educational Psychology	Journal of Educational Research	Total
American Educational Research Journal	24 mos.	39 mos.	35 mos.	46 mos.	32 mos.
Educational and Psychological Measurement	89	63	97	90	65
Journal of Educational Psychology	53	120	45	95	76
Journal of Educational Research	49	120	89	56	60
Total	44	77	57	80	61

citation to AERJ was 32 months, again reflecting the fact that the journal was much newer. Turning to the age of citations in each of the journals studied, AERJ and the Journal of Educational Psychology tended to cite more recent work. This finding would indicate that these two journals publish more material in the "hotter" areas of educational research.

Examination of Informal Communication in Educational Research

Research for the average journal article on educational research was completed 20 months before publication. Most authors reported their work before publication. Prepublication dissemination enabled the information consumer to acquire useful information well before its journal publication. This section of the report discusses the effect of prepublication dissemination of information (eventually contained in the articles studied) on other workers in the same areas as those treated in the articles. A schematic diagram of the model underlying the information exchange process is shown in Figure 2 and the text refers to these events by the letters used in the diagram.

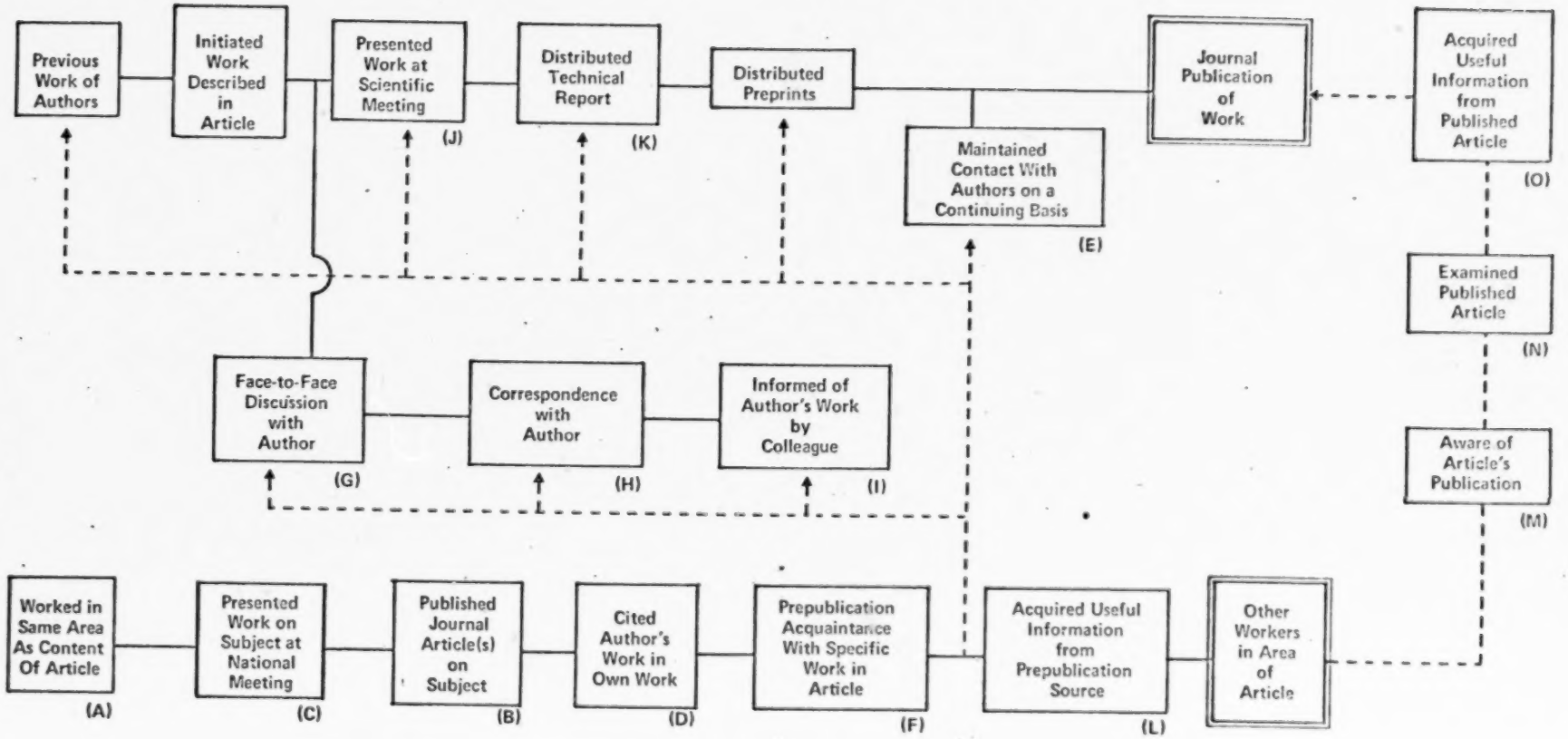
Characteristics of Respondents

Presented in Table 5 are the characteristics of the article authors and the other workers in the field (named by the authors or the other workers in the field). The characteristics of the two groups were quite similar except that the other workers were more experienced in the field (the typical other worker had received his highest degree six years before the typical author). Additionally, more of the other workers compared to the authors indicated basic research and fewer teaching as their primary professional activity and more indicated some activity in administration and research guidance.

Involvement in the Same Area as that Reported in the Articles

Most of the other workers (58%) had conducted work in the same subject-matter area as that described in the critical article within a year prior to the publication of the article (A). The other workers had actively disseminated the results of their work in the area of their critical articles. Fifty-five percent had published at least one journal article (B) and 56% had presented work in the same area at a national meeting (C). The median number of such articles published by those that did publish their work in journals was three and the median date when the first article appeared was 54 months before the publication of the critical article, while the latest such article was published one month before the publication of the critical article. The 67 other workers who named the journal which published their latest article, indicated that they had appeared in 45 different journals. The Journal of Educational Psychology and the Journal of Verbal Learning and Verbal Behavior were the most frequently mentioned outlets for the work, each publishing five such articles. The latest national meeting presentation was made on the average seven months before the critical article was published. The two most frequently mentioned meetings where these presentations were made were at an AERA meeting (mentioned by 36% of those making such presentations) and an American Psychological Association meeting (mentioned by 27%).

Figure 2



Schematic Diagram of Pre and Post-publication Assimilation of Information

Table 5

Characteristics of Respondents

	Percentages	
	Authors (N=385)	Other Workers (N=159)
Highest Degree		
Doctorate	88.6%	94.9%
Median Date	(1964)	(1958)
Specialized in Psychology	43.6	44.6
Specialized in Educational Psychology	21.8	22.6
Specialized in Education	27.0	25.1
Primary Professional Activity		
Teaching	40.8	27.0
Basic Research	15.3	27.0
Applied Research	11.7	13.8
Administration	14.8	15.0
Research Guidance	2.1	6.2
Consulting	2.1	1.2
Design and Development	2.9	3.1
Test and Support	2.3	0.6
Professional Activities (any type involvement)		
Teaching	81.8	85.0
Basic Research	62.1	68.6
Applied Research	73.5	66.7
Administration	50.9	69.5
Research Guidance	71.4	82.4
Consulting	62.6	64.8
Design and Development	37.9	42.2
Test and Support	31.4	19.5

Respondents' Contact with Information in the Published Journal Articles

This section of the paper deals with the nature and extent of other workers contact with the information reported in the critical articles. First communication activities which occurred before publication of the critical articles will be considered and the post-publication communication activities.

Most of the other workers (71%) were acquainted with the previous work of the article authors; work conducted by authors before that reported in the critical articles. Moreover, 50% of the other workers had cited the authors previous work in their own work (D).

Turning to the communication between authors and other workers, 50% of the other workers reported that they maintained contact with the authors on a continuing basis to exchange scientific or technical information (E). In addition, 55% of the other workers were acquainted with the specific work described in the critical articles before publication (F). On the average these other workers were acquainted with this work 20 months before it was published or at the time of its completion. Knowledge of the work prior to its publication was typically obtained through informal channels. For example, 35% of the total sample of other workers learned of the material through face-to-face discussion with the author (G) and 12% each learned of it through correspondence with the author (H) or a preprint (I). However, only 6% of the other workers learned of the material from a national meeting presentation (J) and 4% from a technical report (K). Finally 45% of all the other workers acquired information which they felt would be useful in their current or future work from prepublication sources (L).

Another way of looking at assimilation of information contained in the article before its publication is to examine the data from only those other workers who were acquainted with the material before its publication. Sixty-two percent of these other workers learned of the material through face-to-face discussion with the author, 22% of them obtained it through correspondence with the author and 22% from a preprint. Only 11% learned of it from a national meeting and 8% from a technical report.

This information of the content of the articles obtained before its publication had a tremendous impact on those other workers who were acquainted with it. Eighty-one percent of these other workers acquired information from prepublication sources which they found useful in their current or future work. This information proved useful in a variety of ways. The most frequently mentioned ways in which the information proved useful were: reinterpretation of data (mentioned by 27% of those who found the information useful); incorporation of a new technique (mentioned by 22%); revision of procedures and as a background (each mentioned by 18%), and specific results (mentioned by 15%). The three parts of the papers which proved most useful were: methodology (mentioned by 52% of those finding the information useful); results (mentioned by 44% and theory (mentioned by 27%).

Turning to the other workers postpublication contact with the critical articles, 61% of the other workers were aware that the

article had been published (M). Another 31% had not seen the issue in which it was published and 8% were unaware of its publication but had seen the issue in which it appeared. Over half (53%) of all the other workers or 88% of those who were aware of its publication had examined it (N). Thirty-six percent of all other workers or 68% of those who examined the article read it in its entirety. Another 13% of all other workers or 25% of those who examined it, had merely scanned the article. The remaining respondents had read only a portion of the article. Compared with the usefulness of the information obtained from prepublication sources, the information in the journal article proved less useful to the other workers. Only 12% of the other workers or 22% who examined the journal article obtained useful information from it (O) while 45% of all other workers or 81% of those with prior acquaintence had obtained useful information from prepublication sources. The ways in which the information proved useful and the sections of the journal articles which proved most useful were quite similar to the findings from prepublication sources.

Comparison of other workers acquainted with the work described in the articles before their publication with the other workers having no such acquaintance.

More than two-fifths of the other workers indicated that they had no acquaintance with the specific work reported in the journal articles before their publication. In this section the background characteristics and scientific information-exchange behavior of this group (No-Prior-Contact group) will be compared with those respondents who were acquainted with the content of the article before its publication (Prior-Contact group).

By and large, there were few differences in the background characteristics of the two groups. However, compared to the Prior-Contact group, the No-Prior-Contact group had on the average received their highest degree three years earlier and fewer of them had received their degrees in educational psychology (17% compared to 27% of the Prior-Contact group). Moreover, more of the Prior-Contact group indicated some involvement in administration (75% compared to 56% for the No-Prior-Contact group) and design or development work (49% compared to 34% of the No-Prior-Contact group).

The two groups differed in the extent to which they were active, in the last year, in the same subject-matter areas as those of the articles, the Prior-Contact group was more active (70% of them compared to 42% of the No-Prior-Contact group indicated such activity). Both groups were active in disseminating the results of their work in the same subject-matter area. Fifty-eight percent of the Prior-Contact group and 52% of the No-Prior-Contact group had published an article in the area and 58% of the former group and 53% of the latter group had made a national meeting presentation in the area. There was evidence that the No-Prior-Contact group identified more with psychology than educational research. For example, while only 17% of the respondents in the Prior-Contact group who had made a national meeting presentation had made their latest presentation at an American Psychological

Association meeting, 39% of the No-Prior-Contact group had done so. On the other hand, 41% of the Prior-Contact group had made their latest presentation at an AERA meeting while only 31% of the No-Prior-Contact group had done so.

More of the Prior-Contact group reported awareness of the author's earlier work than did the No-Prior Contact group. Ninety percent of the Prior-Contact group compared to 48% of the No-Prior-Contact group reported such acquaintance. Furthermore, among those respondents in each group familiar with the author's previous work, the Prior-Contact group had more frequently cited the author's previous work in their own reports (75% of these Prior-Contact respondents compared to 59% of those No-Prior-Contact respondents) and had more often maintained continuing contact with the authors to exchange scientific or technical information (81% among the respondents in the Prior-Contact group compared to 47% of those in the No-Prior-Contact group).

Seventy-eight percent of the Prior-Contact group and only 39% of the No-Prior-Contact group at the time of the survey knew that the article had been published. Moreover, 15% of the Prior-Contact group and 44% of the No-Prior-Contact group had not seen the issue of the journal in which the article was published.

Sixty-five percent of the Prior-Contact group and 39% of the No-Prior-Contact group had examined the article. Thus all of the respondents in the No-Prior-Contact who were aware of the article examined it while 83% of those Prior-Contact repondents had done so. The Prior-Contact group had examined the article more thoroughly (72% of the respondents in the Prior-Contact group who had examined the article read all of it, while 61% of those respondents in the No-Prior-Contact group had done so).

The published article was of little use to those respondents who were familiar with the work before its publication. Only 2% of the Prior-Contact group had gained useful information from the published article. Since 47% of this group had read the entire article, the information in the published article seemed redundant and served for the Prior-Contact group essentially as a check, after the manuscript had gone through the reviewing process. That is, they wanted to see if anything new or different had been added to the content of the article since they had encountered information about it earlier in the informal domain.

The situation for the No-Prior-Contact group appeared totally different. Twenty-four percent of these respondents acquired useful information from the article. This figure seemed especially impressive because only 39% of this group were aware that the article had been published. Thus, 61% of the No-Prior-Contact group who examined the article found useful information in it.

Thus, the published article served mainly those persons who were not part of the informal network through which the published articles had been disseminated well before publication. Moreover, the ways in which the information obtained from the articles and prepublication sources proved useful were similar. Therefore, while prepublication sources serve similar information functions as do the articles for workers active in the area, they do so much earlier in the dissemination process.

Authors Use of Scientific Information

Because scientists are both producers and consumers of scientific and technical information, the authors were asked, concerning the most recently completed activity of their current research, the nature of the scientific or technical information they especially needed (and sought beyond their own knowledge at the time) and the source (s) from which they eventually obtained the information.

As is shown in Table 6 the activity to which the authors were referring was preparation of a report of the work (indicated by 33%). Other activities indicated by at least one-tenth of the authors were interpretation of results (16%), collection of data (11%) and preliminary experimentation or field trials. The authors indicated a wide variety of information needs (see Table 7). The following were types of information needed by at least one third of the respondents: to place the work in proper context with similar work already completed (48%); to relate the work to ongoing work in the area (44%); to aid in perception or definition of the problem (38%); to integrate the findings into the current state of knowledge in the area (38%); to choose a data analysis technique (34%) and to enable full interpretation of collected data (33%). Journal articles (mentioned by 67% of the respondents) and local colleagues (64%) were the two most frequently indicated sources of scientific or technical information. Given the existence of the Eric system it is interesting to note that only 30% of the respondents used technical reports as a source of information (see Table 8).

An understanding as to the relationships between stage of research, information need and source of information can be obtained when these variables are cross-tabulated. The data presented in Table 9 indicate that at each stage of their researcher the authors needed a wide variety of types of information. Thus no one type of information was especially needed at any particular stage. Shown in Table 10 are the sources of information used as a function stage of research. Journal articles, books and local colleagues were typically the most frequently mentioned sources of information at each stage in the research process. A number of respondents indicated that they used non-local colleagues as sources of information in the data analysis, preliminary experimentation and preliminary planning stages. Technical reports were frequently used in the theoretical or conceptual planning stage.

Shown in Table 11 are the sources of information used as a function of information need. Journal articles and books were the two most frequently indicated sources for the following types of information: perception or definition of problem; placing work in proper context with similar work; relating work to ongoing work in the area; and integrating the findings into the current state of knowledge in the area. Local colleagues were most frequently used as the source of the following types of information: selecting a design strategy for data collection; selecting a data gathering technique; choosing a data analysis technique; and enabling full interpretation of the data. Thus formal media are basically used for broad information needs while local colleagues are used for very specific types of information.

Table 6

Stage of Research in which Authors had Information Need

Stage of Research	(N=192)
Preliminary Planning	4.7%
Preparation of Written Research or Developmental Proposal	2.7
Theoretical/Conceptual Planning	4.7
Equipment/Apparatus Design Planning	1.3
Experimentation/Study Design Planning	4.0
Other Planning	2.0
Calibration, Pretesting, etc.	2.0
Preliminary Experimentation Field Trials on Mockups	10.1
Collection of Data	11.4
Analysis of Data	6.7
Interpretation of Results	16.1
Preparation of Report Work	32.9
Other	1.3

Table 7

Authors Information Needs

Information Needs	(N=192)
Perception or Definition of Problem	38.5%
Formulate Scientific or Technical Solution	28.1
Place work in proper context with similar work	47.9
Relate work to ongoing work	43.8
Select design strategy for data collection	29.2
Select data gathering technique	23.4
Design equipment of apparatus	16.7
Choose Data analysis technique	34.4
Enable interpretation of data	32.8
Integrate findings into current state of knowlege in area	38.5
Other	----

Table 8

Sources of Scientific Information

Information Source	Respondents[a] (N=192)
Local Colleagues	64.1%
Students	24.0
Meeting Presentations	18.2
Technical Reports	29.7
Non-local Colleagues	32.3
Preprints	24.5
Journal Article	66.7
Books	49.5
Other	----

a) Since a respondent could indicated more than one source of information the percentages add to more than 100%.

Table 9

Information need as a function of state of activity

Information Need	Stage of Research: Preliminary Planning	Preparation of Written Research or Development Proposal	Theoretical Conceptual Planning	Equipment Apparatus Design Planning	Experimental Study Design Planning	Other Planning	Calibration Pretesting etc.	Preliminary Experimentation Field Trials or Mockups	Collection of Data	Analysis of Results	Interpretation of Results	Preparation of Report of Work	Other
Perception or defintion of problem	14.3%	14.3%	12.2%	16.7%	13.6%	12.5%	25.0%	12.5%	4.2%	10.5%	13.7%	12.2%	12.5%
Formulate Scientific or Technical Solution	14.3	4.8	9.8	-----	9.1	25.0	8.3	12.5	4.2	8.8	7.4	8.0	-----
Place work in proper context with similar work	14.3	14.3	14.7	33.3	13.6	25.0	16.7	10.7	14.9	12.3	13.7	15.1	12.5
Relate work to ongoing work in area	14.3	9.5	14.7	-----	9.1	12.5	8.3	12.5	10.6	14.0	14.7	11.8	12.5
Select design strategy for data collection	7.1	9.5	9.8	33.3	9.1	-----	8.3	7.1	14.9	10.5	6.3	8.0	12.5
Select data gathering technique	10.7	9.5	4.9	-----	9.1	-----	-----	10.7	10.6	7.0	5.3	6.3	12.5
Design equipment or apparatus	3.6	4.8	9.8	-----	13.6	12.5	8.3	5.4	4.2	3.5	3.2	4.6	-----
Choose data analysis technique	7.1	9.5	7.3	-----	9.1	12.5	16.7	12.5	10.6	10.5	8.4	11.3	12.5
Enable interpretation of data	3.6	9.5	7.3	-----	4.5	-----	-----	8.9	10.6	12.3	12.6	10.9	12.5
Integrate findings into current state of knowledge in area	10.7	14.3	9.8	16.7	9.1	-----	8.3	7.1	14.9	10.5	14.7	11.8	12.5
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
N	(28)	(21)	(41)	(06)	(22)	(08)	(12)	(56)	(47)	(57)	(95)	(238)	

Table 10

Information source as a function of stage of research

State of Research

Information Source	Preliminary Planning	Preparation of Written Research or Development Proposal	Theoretical Conceptual Planning	Equipment Apparatus Design Planning	Experimental Study Design Planning	Other Planning	Calibration Pretesting etc.	Preliminary Experimentation Field Trials or Mockups	Collection of data	Analysis of Results	Interpretation of Results	Preparation of Report of Work	Other
Local Colleagues	20.0%	19.5%	17.9%	42.8%	27.8%	22.9%	3.1%	21.4%	24.2%	15.1%	14.4%	16.7%	33.3%
Students	3.6	2.4	8.0	-----	8.3	-----	3.1	9.9	5.0	2.9	6.1	8.5	4.2
Meeting Presentations	1.8	-----	2.7	-----	2.8	8.6	9.4	6.1	3.3	1.4	6.5	5.4	8.3
Technical Reports	10.9	9.8	17.9	-----	8.3	17.2	9.4	6.9	5.8	12.9	7.4	5.9	8.3
Non-local Colleagues	14.5	4.9	7.1	-----	-----	8.6	9.4	14.5	10.8	18.7	7.9	8.8	8.3
Preprints	3.6	-----	3.6	-----	-----	17.2	18.8	3.8	5.0	9.6	8.7	2.7	-----
Journal Article	20.0	31.7	21.4	28.6	22.2	17.2	28.1	22.9	25.8	24.5	27.1	27.5	12.5
Book	21.8	29.3	21.4	28.6	30.6	5.7	15.6	13.7	15.8	15.8	17.5	20.4	25.0
Other	3.6	2.4	-----	-----	-----	2.9	3.1	.8	4.2	-----	4.4	4.1	8.3
Total	100.0% (N=55)	100.0% (N=41)	100.0% (N=112)	100.0% (N=07)	100.0% (N=36)	100.0% (N=35)	100.0% (N=32)	100.0% (N=131)	100.0% (N=120)	100.0% (N=139)	100.0% (N=229)	100.0% (N=556)	100.0% (N=24)

Table 11

Information source as a function of information need

Research Activity

Information Source	Perception of definition of problem	Scientific or technical solution	Place work in proper context with similar work	Relate work to ongoing work in area	Select design strategy for data collection	Select data gathering technique	Desgin equipment or apparatus	Choose data analysis technique	Enable interpretation of data	Integrate findings into current state of knowledge in area
Local Colleagues	2.2%	21.6%	11.8	11.7	25.3	26.2	19.4	24.3	22.6	14.2
Students	12.1	9.0	4.4	4.3	9.7	5.6	9.7	4.1	7.4	3.5
Meeting Presentations	6.5	4.2	5.9	6.2	3.9	4.0	1.4	2.0	6.3	6.0
Technical Reports	11.6	7.8	9.9	10.5	9.1	11.1	9.7	8.1	6.3	6.5
Non-local Colleagues	12.1	10.8	9.2	12.4	10.4	7.9	13.8	11.5	13.2	11.6
Preprints	4.7	6.0	5.9	8.9	5.8	3.2	5.5	4.1	4.7	6.0
Journal Article	28.0	21.6	32.7	28.0	14.3	21.4	20.8	19.6	17.4	30.6
Book	19.8	15.6	18.6	16.3	16.9	15.9	16.7	23.0	17.9	20.1
Other	3.0	3.6	1.5	1.6	4.5	4.8	2.8	3.4	4.2	1.3
Total	100.0 (N=232)	100.0 (N=167)	100.0 (N=272)	100.0 (N=257)	100.0 (N=154)	100.0 (N=126)	100.0 (N=72)	100.0 (N=148)	100.0 (N=190)	100.0 (N=232)

Conclusions and Recommendations

The information flow process from initiation of a piece of research until its integration into the archival body of scientific knowledge is extremely long and slow. Only a little flows through "public" media compared with media which reach only a limited audience, and this stage generally comes late in the dissemination process. The active researcher cannot wait for the work to be published for if he did so, he would be obtaining "obsolete" information. Moreover, in educational research because of the multitude of journals which publish such material and the lack of an abstract journal, it is quite likely that the researcher is unaware of an article's publication. For example, 39% of the other workers were unaware of the article's publication and 89% of the persons who requested a copy of an AERA meeting presentation, which was later published, were unaware of it's publication.

From this and our earlier studies (Nelson, Garvey and Lin, 1970; Nelson, 1972) it is quite evident that both the formal and informal communication systems in educational research are extremely diffuse it is therefore, extremely difficult for the researcher to obtain the information he needs. Three probable causes of this situation are 1) the field is interdisciplinary, 2) it has grown rapidly in the recent past, and 3) there are numerous professional organizations in the area.

An examination of the lags in the overall information-flow process reveals a number of critical points which not only confirm the need for improvement of the process, but also the loci where such improvements are necessary.

Before presenting some suggestions for alleviating these problems, it should be stressed that there are three major groups involved in the dissemination process: professional societies, the federal government and for-profit publishers. If the communication system in educational research is to be improved, it will be necessary for each of these groups to cooperate with each other and the educational R & D community. The professional societies typically sponsor various types of meetings from small conferences to large annual meetings and publish the most important journals in the field. The National Institute of Education, to succeed in its mission, must be concerned with not only the dissemination of research it supports, but also the total communication system in educational R & D. The private for-profit or ganizations traditionally, have been particularly effective in providing information for the practitioner and in developing specialized, higher user oriented services (NAS, 1969).

There are a number of problems associated with the journal literature in educational research. Yet for all its problems the journal article is still the ultimate outlet for most scientific work and is the most frequently used source of scientific information. Journal authors were asked, in conjunction with their current research, the nature of the scientific or technical information they especially

needed and the source or sources from which they eventually obtained the information. The two most frequently mentioned sources were journal articles (mentioned by 67% of the respondents) and local colleagues (mentioned by 64%). No other source was mentioned by half the respondents. Therefore the question becomes how can the journal better fulfill its functions rather than can the journal article be eliminated.

Before making suggestions as to how the journal article can be improved, it is first necessary to examine the functions it now serves. First, the journal article can no longer be regarded as a vehicle which effectively conveys current scientific information. The study of the usefulness of information published in journal articles was directed at a special class of information users--workers active on the research front associated with the specific subject matter of the articles. The results of the study clearly showed that most such workers had gained useful information, later contained in journal articles, well before the work was published. Those persons who found information in the published article useful were those who had no earlier contact with the information.

Furthermore the study of the authors' information needs clearly indicated that the journal article is used to fit the author's work into a larger framework. For example, the journal article was the most frequently cited source for the following information needs: to aid in perception or definition of problem; to place the work in proper context with similar work already completed; to relate the work to ongoing work; and to integrate the findings into the current state of knowledge in the area. However, the journal article does not function in the capacity of integrating scientific information into a larger framework because two-thirds of the articles report single studies and only 3% report a series of studies. Not only are most articles reports of single studies but only 37% of the authors had within two years of the publication of their original article submitted a manuscript in the same subject matter area to a journal and only 25% had had such an article published. Thus, journals tend to contain single studies by authors who seldom publish anything else in the same area.

To be maximally effective in fulfilling its function of intergrating scientific information into a larger framework, journals should strongly encourage the authors to report a series of conceptually integrated studies rather than single one-shot works. This, of course, leaves us with the problem of the single study. These should be published in a new journal similar to Psychonomic Science. This latter journal should be refereed but have a short publication lag and should limit the length of the articles to four or five pages. An author could then publish a series of single studies in the new journal and then integrate them into an article for AERJ for example.

This new system of two types of journals would hopefully alleviate another problem with journals as they are presently constituted--namely the long period of time between submission and publication of manuscripts.

As it presently stands the publication lag constitutes 39% of the time between the initiation of a piece of work and its publication. Not only is this period long, 13 months, but it is also critical since most authors cease to report the work once it has been submitted. First the new journal, which will publish short articles, will hopefully have a short publication lag. This can be accomplished in two ways: it can have a high rejection rate, and it can be a large journal. For educational research the latter seems preferable since journals in educational research typically have high rejection rates and publish relatively few manuscripts in any year. Second, a list of manuscripts accepted by the integrative journal should be published in the journal before these articles appear. Such a listing would allow interested persons to obtain the information four to eight months sooner and would also be helpful in alerting scientists to work being published soon.

As was mentioned previously, there was a multitude of journals publishing material on educational research and most of these journals publish few articles in any year. It would be of benefit to the consumer if a number of these journals could be combined into a small number of larger journals. The National Institute of Education should, as soon as possible, sponsor a meeting of all interested parties to facilitate such combinations of journals. One possible method for accomplishing this would be for a number of professional societies to form a "super" society which would be in charge of all publication. Such a system has worked well in physics with the American Institute of Physics being the "super" society.

It will obviously take funds to implement both the starting of the new journal and the combination of journals which have been recommended. The National Institute for Education can assist the professional societies in implementing these proposals in two ways. First, it could provide money directly to the association so that they could plan changes in their publication practices. Second, they could encourage their grantees to use a portion of their funds to pay for page charges. As envisioned the new journal would publish a large number of manuscripts and could in all probability only be supported by page charges since page charges allow a journal to publish as many articles as possible without worrying about page allotments. This latter system is typical in the physical sciences. However, page charges are only payed if the author's institution or grant will pay them. If not, no charges are levied.

Another major problem associated with the process of scientific communication in educational research involves the lack of integration of new work into the present body of literature. Given the numerous number of journals which publish material relevant to educational research, a comprehensive abstract journal is a necessity. In examining the last six issues in 1971 of Current Index to Journals in Education for citations to the journals studied, only 36 of the 204 citations contained abstracts of the articles. Herner, Griffith, and Herner (1968) found that there was no one abstract journal which published abstracts of even the core journals in educational research and the situation has not changed. CIJE would seem to be the publication to provide this service, but it must publish abstracts to be

of any use.

In conclusion, the recommended innovations should improve the scientific communication system in educational research. However, the planning and instituting of these changes should be followed by an evaluation of the innovations. The only way the scientific communication system can be made efficient is to continually monitor the system and make changes as soon as problems arise. Educational research and development simply cannot afford to have an inefficient communication system.

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